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Early perivascular clustering of dendritic cells and mast cells in human skin wounds

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Skin wounds determine a cascade of chemical and morphological events directed at hemostasis, prevention or arrest of infection, removal of damaged tissue and eventually repair. We could show that mast cells modify in number [Bonelli et al., *Int. J. Leg. Med.* 117: 14-18, 2003] and change their content in TNFalpha [Bacci et al., *Int. J. Leg. Med.* 120: 38-42, 2006] at the border of a wound since early after injury. Dendritic cells can be at play in natural immune responses, besides antigen presentation, therefore their behavior in wounded skin deserves attention.

We have investigated on the presence and intercellular relationships of mast cells and dendritic cells in human skin wounds suffered from no more than 60 min; control specimens were taken at least 20 cm from a wound. Cryosections, fixed in cold acetone, were fluorescent stained with avidin (mast cells) and Ulex europaeus-1 lectin (UEA-1: endothelium) and immunolabeled for MHC-II (dendritic cells), CD1a (Langerhans cells) and PDGF.

In the epidermis, Langerhans cells were found to undergo transient increase in number and labeling intensity, while dermal dendritic cells continued to increase in number and labeling intensity until 60 min. In control skin, mast cells and dendritic cells were sparse and only exceptionally close to each other; upon wounding, cell clusters formed progressively along blood vessels and included a majority of MHC-II positive cells and several mast cells, often strictly close to MHC-II positive cells. Isolated MHC-II positive cells and mast cells outside these clusters were exceptional. The binding of UEA-1 and the labeling for PDGF in control skin was limited to the spinous and granular epidermal layers and dermal capillaries. In wounded skin the intensity of epidermal labeling was increased and, most relevant, the number of labeled capillaries increased markedly.

The results suggest that: immature cells residing in the epidermis may come to express CD1a quickly; dendritic cell recruitment and redistribution in the dermis may occur quite fast upon injury; the latter cells participate to the response to wounding since the early steps, coordinately with mast cells and capillary endothelium. Therefore, dendritic cells are candidate to regulate injury response in human skin, together with mast cells.

Key words

Mast cells, dendritic cells, wound healing